

Docket No. : ADAMSRI.031A  
Application No. : 10/664,699  
Filing Date : September 18, 2003

**Customer No.: 20,995**

**CORRECTED APPEAL BRIEF**

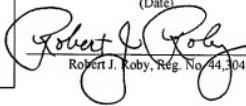
Applicant : Leary et al.  
App. No : 10/664,699  
Filed : September 18, 2003  
For : AIRCRAFT WATER HEATING SYSTEM  
Examiner : Mark H. Paschall  
Art Unit : 3742

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Robert J. Roby, Reg. No. 44,304

**Mail Stop Appeal Brief-Patents**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Appellant, Applicant in the above-captioned patent application, appeals the rejection of Claims 1, 2, and 4-25 set forth in the Office Action mailed on January 17, 2008 (hereinafter "the Final Office Action"). All of these claims have been twice rejected. In accordance with the Notice of Appeal filed on May 16, 2008, Appellant submits this Appeal Brief. Please charge any fees that may be required now or in the future to Deposit Account No. 11-1410.

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#### **I. REAL PARTY IN INTEREST**

The real party in interest in this appeal is the assignee of the present application, Adams Rite Aerospace, Inc. ("Assignee"). Assignee is the owner of one-hundred percent interest in the present application as evidenced by an assignment recorded at Reel No. 014519, Frame 0848 by the Assignment Branch of the United States Patent and Trademark Office.

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## **II. RELATED APPEALS AND INTERFERENCES**

Appellant, Appellant's legal representative and Assignee are aware of only one prior or pending appeal, interference or judicial proceeding that may be related to, that may directly affect, that may be directly affected by, or that may have a bearing on the Board's decision in the present appeal. The prior appeal resulted in examination being reopened. Because the Examiner reopened prosecution without filing an Examiner's Answer in the earlier appeal filed in the present application, no decisions are included in the appendix labeled RELATED APPEALS AND INTERFERENCES.

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### **III. STATUS OF CLAIMS**

Currently, the following status exists for each of the claims: Claims 1, 2, 4 and 6-25 stand rejected as being unpatentable. Claims 3 and 5 were previously cancelled.

The rejections of Claims 1, 2, 4 and 6-25 are being appealed.

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**IV. STATUS OF AMENDMENTS**

No amendments have been filed subsequent to the rejection. Therefore, the claims before the Board appear as they were rejected in the Office Action mailed on January 17, 2008.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

The present application includes three independent claims, Claims 1, 14 and 19. Each independent claim is summarized below, with citations to corresponding portions of the originally-filed specification and drawings as required by 37 C.F.R. § 41.37(c)(1)(v). These citations are provided to illustrate specific examples and embodiments of the recited claim language and may not include all examples of the recited claim language. Further, these citations should not be used to limit the claims.

### Claim 1

Claim 1 is directed to a water heating apparatus for use with a wash basin on an aircraft. The water heater comprises:

- a tube (*see, e.g., element 10 in Figure 1, and page 2, paragraph [0012], lines 1-2*) made of a good heat conductive material (*see, e.g., page 2, paragraph [0013], lines 1-3*);
- the tube comprising a plurality of coils (*see, e.g., Figure 1 and page 3, paragraph [0013], lines 6-8, and page 4, paragraph [0018], lines 1-4*) with each coil either engaging or being close to an adjacent coil (*see, e.g., Figure 1*);
- an electric heater (*see, e.g., element 12 in Figure 1 and page 2, paragraph [0012], lines 2-3*) extending along a substantial length of the tube in good heat conductive relation with the tube (*see, e.g., page 2, paragraph [0012], lines 2-3 and 4-7*);
- the electric heater being positioned exterior to the tube such that deposits do not form on the electric heater (*see, e.g., Figure 1 and page 4, paragraph [0018], lines 1-5*);
- the heater comprising coils with each heater coil being adjacent to a pair of adjacent tube coils but not encircling an axis of the tube (*see, e.g., Figure 1 and page 4, paragraph [0018], lines 1-5*); and
- the substantial length of the tube along which the electric heater extends defining a volume of less than that required to contain approximately 14

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ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water (*see, e.g., page 3, paragraph [0015], lines 4-6 and paragraph [0016], line 5*).

Claim 14

Claim 14 is directed to a method of heating small volumes of water for intermittent usage in a wash basin on an aircraft. The method comprises:

- providing a tube (*see, e.g., element 10 in Figure 1, and page 2, paragraph [0012], lines 1-2*) that can be connected to a water outlet;
- the tube being made of a good heat conductive material (*see, e.g., page 2, paragraph [0013], lines 1-3*);
- providing an electric heater (*see, e.g., element 12 in Figure 1 and page 2, paragraph [0012], lines 2-3*) that is in good heat conductive relation with the tube (*see, e.g., page 2, paragraph [0012], lines 2-3 and 4-7*); and
- the tube and the electric heater being in contact over a length that defines a volume of less than that required to contain approximately 14 ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water (*see, e.g., page 3, paragraph [0015], lines 4-6 and paragraph [0016], line 5*).

Claim 19

Claim 19 is directed to an aircraft sink water heater. The aircraft sink water heater comprises:

- a water tube (*see, e.g., element 10 in Figure 1, and page 2, paragraph [0012], lines 1-2*) comprising an inlet and an outlet;
- the water tube comprising a spiral configuration to define a series of water tube coils (*see, e.g., Figure 1 and page 3, paragraph [0013], lines 6-8, and page 4, paragraph [0018], lines 1-4*);

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- an electric heater (*see, e.g., element 12 in Figure 1 and page 2, paragraph [0012], lines 2-3*) comprising a spiral configuration to define a series of electric heater coils (*see, e.g., Figure 1 and page 4, paragraph [0018], lines 1-5*); and
- the electric heater coils and the water tube coils having a common axis of curvature (*see, e.g., Figure 1*) and each of the series of electric heater coils being in intimate relationship with only two adjacent coils of the water tube coils(*see, e.g., Figure 1 and page 4, paragraph [0018], lines 1-5*).

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#### **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

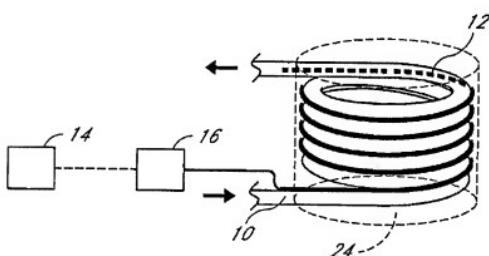
The sole grounds of rejection before the Board is whether the subject matter of each of Claims 1, 2, 4 and 6-25 is properly rejected under 35 U.S.C. § 103(a) as unpatentable over EP 350453 issued to Christophers (hereinafter “Christophers”) in view of U.S. Patent No. 3,711,681 issued to Leuschner et al. (hereinafter “Leuschner”) and further in view of UK Published Patent Application No. GB 2,157,815 filed by Edey (hereinafter “Edey”).

## VII. ARGUMENT

For the reasons explained below, Appellant respectfully submits that the rejections of Claims 1, 2, 4 and 6-25 under 35 U.S.C. § 103 are improper and, therefore, Appellant respectfully requests reversal of the rejections. Appellant respectfully submits that a prima facie case of obviousness has not been established.

### Brief Explanation of the Aspects of the Present Invention

In general, the present inventions relate to aircraft sink water heaters used in the aircraft lavatories. The heaters quickly heat a small volume of water in tube coils, which volume is sufficient to wash a user's hands. *See Abstract*. The used volume of heated water is replenished between uses by heating such that the water heater can be thought to have a small replenishing tank that is defined within the tube coils. The aircraft sink water heater was designed to provide a compact water heating system for intermittent, small volume usage. [0004]. The heater was designed to weigh less than a tank-based system, to avoid issues relating to pressure vessels that tank-based systems have and to use less electricity than a tank-based system.



As shown to the left in reproduced Figure 1 of the present application, the aircraft sink water heater comprised a water tube 10 that was coiled in a relatively tight spiral, which created a series of coils. [0011]. The coiled tube 10 was formed with a plurality of coils

such that each of the plurality of coils was engaging or close to an adjacent coil. [0017]. The tube 10 has an inlet that can be in communication with a water supply and the tube 10 has an outlet that can be in communication with an aircraft wash basin. [0013].

An electrical heater 12 was formed in a spiral coil [0017] and adjoined the tube 10 in good heat conductive fashion. [0011]. The heater 12 was positioned external of the tube 10 to limit deposits that would form on the heater 12 if the heater 12 was in direct contact with the water inside of the tube 10. [0003]. Preferably, the coils of the heater 12 were adjacent to a pair of coils of the tube 10 such that the coils of the heater 12 were positioned within the recesses

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defined between adjacent coils of the tube 10. [0017]. The heater 12 extended along a substantial length of the tube (e.g., a substantial length is sufficient to contain a volume of less than that require to contain approximately 14 ounces of water) and was in good heat conductive relation with the tube 10. [0011].

*Discussion of the Applied References*

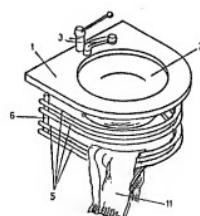
The obviousness rejection is based upon a combination of three references: Christophers; Leuschner; and Edey. Each of these references will be introduced before the basis for the rejection of each of the claims will be discussed.

Initially, Appellant notes that the text of the present Office Action mailed on January 17, 2008, which was issued in response to the prior Appeal Brief, is identical to the text of the Office Action previously appealed, which was mailed on January 31, 2007, except that the phrase “GB’815” has been substituted for the word “English” throughout. In other words, only the name of one of the secondary references has been changed – even the description of the secondary reference (which was different in the prior Office Action) remains from the prior Office Action.<sup>1</sup>

*Christophers*

Christophers, which is in the German language, was relied upon solely based on the English Abstract. The title of Christophers translates to “Washbasin with Radiator.” The English Abstract states:

The radiator contains a plurality of heating pipes (5), which are situated one above another and are each bent in an approximately U-shaped fashion and are arranged below a wash stand panel (1) around a wash-basin (2). The horizontally extending heating pipes (5) are each connected at their ends to an approximately vertical supply and return line (6, 7) to form a stable unit. The said unit is fastened by means of fastening lugs or the like to the vertical wall of a building. In this way, the heating device can be installed independently of the wash stand/wash-basin.



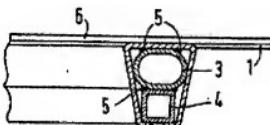
<sup>1</sup> For the record, Appellant disagrees with the Examiner’s characterizations of Appellant’s prior arguments. For example, Appellant did not previously argue that “the instant claims are directed to an instantaneous heater, for basin water heating.”

Thus, Christophers taught a washstand that contained a wash basin 2 and that included a radiator surrounding the wash basin 2. The radiator comprised U-shaped heating pipes 5 that were connected to a flow pipe 6 and a return pipe 7 of a central heating or domestic water pipe (see EP 0 350 453 B1 – English Claim 1)

The radiator of Christophers received heated water from a heated water supply external of the radiator disclosed by Christophers. Christophers, in Claim 6, recited that an electric heating member could be inserted into one heating pipe 5. Thus, water would presumably flow around the electric heating member as it flowed through the heating pipe 5 to buffer the heat generated while also heating the water. Such a construction would result in deposits being formed on the electric heating member.

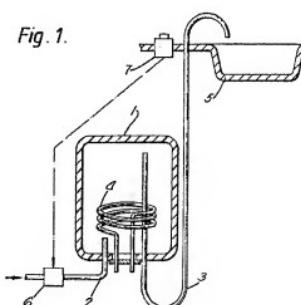
Leuschner

Leuschner taught an electric flow-through heater for making coffee. The assembly of Leuschner consisted of a water tube 3 that had an exterior surface fixed to a tubular heating body 4 along its length. To ensure consistent heat transfer relative to the prior art constructions, the water tube 3 and the tubular heating body 4 were tightly clamped by lugs and were joined to each other by brazing 5. The heated tube of water was used to heat the carrier plate 6, upon which a pot of coffee or the like could be supported.



Edey

Contrary to the assertion by the Examiner, Edey did not clearly teach the “use of flow through heaters to heat only a single cup at a time, whatever is loaded into the heater tube reservoir.” Edey taught an electric water heater designed for undersink use where the water heater was a tank-based water heater and NOT a flow through water heater. This is clearly shown in Figure 1, which is reproduced to the right and is evidenced by the use of “container” throughout the written



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description of Edey (e.g., at page 1, lines 5-8: "This invention relates to electric water heaters of the kind *comprising a container in which is located a sheathed wire electric heating element ...*").

In the construction taught by Edey, a container 1 received water from a first tube 2 that terminated within the container 1. A siphon tube 3 was provided that transferred heated water from the container 1 to a faucet outlet. The siphon tube 3 only would be supplied with heated water when the water level rose to a point at least as high as the top end of the inlet of the siphon tube. In order to cause water to flow from the faucet, a valve 6 was opened to cause water to flow into the container 1. As the water flowed into the container 1, the water level within the container 1 would rise to a level higher than the open inlet end of the siphon tube 3, which would cause water to flow out of the container 1 through the siphon tube 3. While in the container 1, the water was heated by an electric heating element 4 identified as a sheathed wire electric immersion heater element having a convoluted shape and positioned within the container.

*The Rejections*

Appellant submits (1) one of ordinary skill in the art at the time of the invention would not have been led by the applied references to the recited construction of the rejected claims and the Examiner has failed to explain why the differences between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention; (2) the combination is based upon the improper use of hindsight; and (3) the combination would completely change the principle of operation of the primary reference. For at least these reasons, Appellant requests that the rejections be reversed.

*The Rejection Must Explain Why The Differences Would Have Been Obvious*

The analytical framework for resolving whether a claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention was set forth in *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966). The *Graham* factors mandate that an objective obviousness inquiry include: (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; and (3) resolving the level of ordinary skill in the art. In this case, the claims differ in significant regard from the prior art. Moreover, while the prior art references need not teach or suggest all the claim limitations, there must be a reasonable explanation why the differences between the prior art and the claimed

invention would have been obvious to one of ordinary skill in the art at the time of the invention. The key, in this case, is that the Examiner must provide a clear articulation why bridging the gap between the claimed invention and the prior art would have been obvious.

*Claim 1*

**No Articulated Reason Regarding “A Plurality of Coils”**

Claim 1 recites, among other limitations, a tube comprising a plurality of coils with each coil engaging or being close to an adjacent coil. The recited coil construction leads to a compact structure that does not take a large amount of space, which is at a premium on an aircraft, and which provides energy efficiencies that reduce the amount of energy needed to heat the water. None of the three applied references taught or suggested the recited coil construction.

Christophers taught four spaced U-shaped members connected to a common inlet and a common outlet. The U-shaped members were spaced apart from each other to maximize heat transfer from the U-shaped members into the room containing the radiator disclosed by Christophers. Moreover, the U-shaped members were not coils because the flow did not circulate from one U-shaped member to the next in a serpentine manner. In other words, the heated water did not flow through the U-shaped members in series. Rather, the heated water flowed through the U-shaped members in parallel. Again, the parallel flow maximized the heat transfer rate. Christophers did not teach coils, let alone a plurality of coils with each coil engaging or being close to an adjacent coil.

Leuschner also did not teach a plurality of coils with each coil engaging or being close to an adjacent coil. Rather, Leuschner only taught a single tube that was bent back upon itself to form a single loop. Thus, Leuschner failed to teach or suggest a tube comprising a plurality of coils with each coil engaging or being close to an adjacent coil.

Edey also failed to teach or suggest a tube comprising a plurality of coils. Although Edey showed a coiled electric immersion heating element, Edey did not teach a coiled tube. Edey simply showed a container with an immersion heating element similar to that discussed in the Background of the Invention at paragraph 0003 of the published application, which would likely fall into the category of a “pressure vessel” when used on an airplane.

Thus, none of the applied references taught a water heating apparatus comprising a tube that comprised a plurality of coils with each coil engaging or being close to an adjacent coil.

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Because none of the applied references taught a tube comprising a plurality of coils with each coil engaging or being close to an adjacent coil, the combination of the three applied references also did not teach such a construction. Moreover, the Examiner has not provided any explanation of where the plurality of coils is taught or why one would have been led to bridge this gap between the prior art and the claimed invention. Thus, for at least this reason, there is no clear articulation of any reason why the claimed invention would have been obvious.

**No Articulated Reason Regarding Coils External to Tube**

Similarly, all three references failed to teach or suggest a heater comprising coils external to the water tube. Only Leuschner taught an external heater and the heater of Leuschner was bent back upon itself to form a single loop. The only heater taught by Christophers was disposed inside the tube. Edey also only taught an electric immersion heater. Thus, none of the applied references taught an external heater comprising coils and, therefore, the combination could not have taught such a construction.

Because none of the applied references taught a coiled tube or a coiled heater, none of the references taught or suggested each heater coil being adjacent to a pair of adjacent tube coils but not encircling an axis of the tube. Thus, the combination of the references did not teach or suggest such a construction. Moreover, the Examiner has not provided any explanation of where the recited construction is taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

**No Articulated Reason Regarding Length of the Tube/Heater Relationship**

Finally, none of the applied references taught that the substantial length of the tube along which the heater extended was a length that defined a volume of less than that required to contain approximately 14 ounces of water. Irrespective of whether the limitations relating to an aircraft are limiting or not, and irrespective of whether the limitations relating to the specific volume are limiting, none of the applied references taught limiting the length of the tube along which the heater extended based upon the volume contained therein.

The Examiner has stated the “[Edey] has been applied for clearly teaching use of flow thru heaters to heat only a single cup at a time, whatever is loaded into the heater tube reservoir.” Appellant notes that this characterization of Edey’s teachings is factually incorrect. Edey did not disclose tubular flow through heater. Edey disclosed heating the entire volume contained within

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a container and dispensing the heated contents only in proportion to fluid added to the container. Thus, significant energy is expended in heating contents of the container that are not dispensed, which is contrary to the claimed invention that heats the contents of the tube prior to dispensing those contents through the same tube, which greatly reduces the energy demands placed upon an aircraft electrical system when compared to heating a stagnant volume contained within a container. Thus, Edey does not "heat only a single cup at a time" even if, under certain assumed but not described operating conditions, the contents of the container are dispensed one cup at a time.

None of the applied references taught that the substantial length of the tube along which the heater extended was a length that defined a volume of less than that required to contain approximately 14 ounces of water. Thus, the combination of the references did not teach or suggest such a construction. Moreover, the Examiner has not provided any explanation of where the recited construction is taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

For all of these reasons, Appellant submits that Claim 1 is patentable over the applied combination.

*Claim 4*

Claim 4 depends from Claim 1 and further recites that the tube has a circular exterior cross-section such that the sections create a recess between the sections and that the heater is positioned in the recess.

Regardless of whether the applied references taught a tube having a circular exterior cross-section, none of the applied references taught the plurality of coils needed to create the recess nor that the heater was positioned in the recess. Leuschner, the only reference that taught an external electric heater, taught an electric heater that was positioned in vertically overlapping relationship with the tube. Thus, none of the references taught the recited construction. Moreover, the Examiner has not provided any explanation of where the recited construction is taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

For all of these reasons, in addition to the reasons discussed above with respect to Claim 1, Appellant submits that Claim 4 is patentable over the applied combination.

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Claims 6 and 7

Claims 6 and 7 depend from Claim 1 and further recite, respectively, that the heater coils are on the outside of the tube coils and that the heater coils are on the inside of the tube coils. These constructions are shown in Figures 1 and 5 of the present application respectively.

None of the applied references taught the plurality of coils of either the tube or the heater. For at least this reason, none of the applied references taught the relative positioning between the heater coils and the tube coils. Thus, none of the references taught the recited construction. Moreover, the Examiner has not provided any explanation of where the recited construction is taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

For these reasons, in addition to the reasons discussed above with respect to Claim 1, Appellant submits that Claims 6 and 7 are patentable over the applied combination.

Claim 8

Claim 8 depends from Claim 1 and further recites that the tube and the heater define a tubular bundle of coils.

None of the applied references taught any tube coils or any heater coils. Accordingly, none of the applied references taught a bundle of coils defined by a tube and a heater. For at least this reason, none of the references taught the recited construction. Moreover, the Examiner has not provided any explanation of where the recited construction is taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

For this reason, in addition to the reasons discussed above with respect to Claim 1, Appellant submits that Claim 8 is patentable over the applied combination.

Claim 9

Claim 9 depends from Claim 1 and further recites that the tube and the heater is each formed with a plurality of coils that are sufficiently large to extend around the exterior of a lower portion of a wash basin.

Again, none of the applied references taught a tube or a heater that was formed with a plurality of coils. Thus, regardless of whether any reference taught positioning a tube around an exterior of a wash basin, none of the applied references taught the recited construction. Moreover, the Examiner has not provided any explanation of where the recited construction is

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taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

For this reason, in addition to the reasons discussed above with respect to Claim 1, Appellant submits that Claim 9 is patentable over the applied combination.

*Claim 14*

Claim 14 recites a tube and an electric heater that were in contact over a length that defined a volume of less than that required to contain approximately 14 ounces of water such that a user on an aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water. As explained above, Christophers did not teach an electric heater at all, Leuschner did not teach the limited contact length and Edey taught an internal heater that was not in contact with any tube. Because none of the applied references taught the recited construction, the recited combination did not teach such a construction. Moreover, the Examiner has not provided any explanation of where the recited construction is taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

For all of these reasons, Appellant submits that Claim 14 is patentable over the applied combination.

*Claim 15*

Claim 15 depends from Claim 14 and further recites providing the tube and the heater with coils with the heater coils being in good heat conductive relation with adjacent tube coils.

None of the applied references taught a tube and a heater with coils such that the heater coils can be in good heat conductive relation with adjacent tube coils. Leuschner, the only reference that taught an electric heater, taught an electric heater that was a single loop. Thus, none of the references taught the recited construction. Moreover, the Examiner has not provided any explanation of where the recited construction is taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

For all of these reasons, in addition to the reasons discussed above with respect to Claim 14, Appellant submits that Claim 15 is patentable over the applied combination.

*Claim 16*

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Claim 16 depends from Claim 15 and further recites applying electrical energy to the heater to heat less than 14 ounces of water in the tube to at least about 115° F in no more than about three minutes.

None of the applied references taught heating less than 14 ounces of water in the tube to at least about 115° F in no more than about three minutes. Leuschner taught an electric heater that was a single loop and Edey taught an immersion heater. Neither of these references taught the temperature, the volume or the time recited by Claim 16. Thus, none of the references taught the recited method. Moreover, the Examiner has not provided any explanation of where the recited construction is taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

For all of these reasons, in addition to the reasons discussed above with respect to Claim 14 and Claim 15, Appellant submits that Claims 16-18 are patentable over the applied combination.

Claim 19

Claim 19 recites a water tube comprising a spiral configuration to define a series of water tube coils and an electric heater comprising a spiral configuration to define a series of electric heater coils with the electric heater coils and the water tube coils having a common axis of curvature and each of the heater coils being in intimate contact with only two adjacent water tube coils. None of the applied references taught such a construction.

Christophers taught a plurality of spaced apart U-shaped tubes arranged in parallel; there were no water tube coils or any intimate contact between the heater coil and the water tube coil. Leuschner et al. taught a water tube with a single loop; there were no water tube coils or any intimate contact between the heater coil and the water tube coil. Edie did not teach any water tube coils or any intimate contact between a heater coil and a water tube coil. Thus, none of the applied references taught such a construction and, therefore, the combination could not have taught such a construction. In addition, the applied references failed to teach that the heater coils and the water tube coils have a common axis of curvature and that each of the series of electric heater coils is in intimate relationship with only two adjacent coils of the water tube coils. Moreover, the Examiner has not provided any explanation of where the recited construction is

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taught or why one would have been led to bridge this gap between the prior art and the claimed invention. For at least these reasons, Appellant submits that Claim 19 is patentable over the applied combination.

*Claims 20 and 21*

Claims 20 and 21 depend from Claim 19 and further recite, respectively, that the heater coils are positioned solely to the outside of the water tube coils and the heater coils are positioned solely to the inside of the water tube coils. These constructions are shown in Figures 1 and 5 of the present application respectively.

None of the applied references taught the plurality of coils of either the tube or the heater. For at least this reason, none of the applied references taught the relative positioning between the heater coils and the tube coils. Thus, none of the references taught the recited construction. Moreover, the Examiner has not provided any explanation of where the recited construction is taught or why one would have been led to bridge this gap between the prior art and the claimed invention.

For these reasons, in addition to the reasons discussed above with respect to Claim 19, Appellant submits that Claims 20 and 21 are patentable over the applied combination.

For the reasons explained above, Claims 1, 2, 4 and 6-25 are patentable and reversal of the rejections is respectfully requested.

*Hindsight Cannot Provide the Basis for the Rejection*

The prior art references must be considered as a whole. While considering the prior art, the prior art references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention. *See Hodosh v. Block Drug Co.*, 786 F.2d 1136, 1143 (Fed. Cir. 1986). The teaching or suggestion to make the claimed combination cannot come from the applicant's disclosure. *See In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). The present rejections are based upon a combination of references that require rather substantial leaps in logic to combine.

As explained above, the rejected claims recite a water heating apparatus for use with aircraft wash basins and a method of heating water for aircraft wash basins. The primary reference, Christophers, taught a space heating radiator that supported a wash basin but that was not fluidly connected to the wash basin. Leuschner, one of the secondary references, taught a

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flow through heater for a coffee maker hot plate. Edey, the other of the secondary references, taught an under the counter water heater. Briefly stated, absent hindsight, Appellant respectfully submits that one of ordinary skill in the art wishing to design a small scale water heating device for use on airplanes would not start with a space heating radiator and modify it with the teachings of a hot plate and an under the counter water heater to arrive at the claimed inventions. Nothing in the references or the prior art in general suggest the desirability of making the combination as set forth in the rejections.

In Christophers, the radiator was connected by an inlet and an outlet to a hot water supply, such as a building's hot water system, and included multiple tubes that extended in parallel with each other, as opposed to extending in series, between the inlet and the outlet. In addition, the water in the radiator was not supplied to the water basin. The water basin simply was supported by the radiator.

Leuschner has been combined with Christophers. Leuschner taught a flow through water heater for a coffee maker hot plate. The supposed teaching or suggestion for the combination was to use the flow through heater to lead to more effective heating of the fluid. Christophers, however, used an existing heated water supply to heat a room through multiple parallel flow paths and, it appears, also had an internal electric heater in at least one of the flow paths. The electric heater, however, was positioned inside of the flow path to allow water to carry the heat supply throughout the radiator rather than supplying heat in a single region. If the heat supply of Leuschner were used, the heat supply would be external of the water tubes and an occupant of the heated room would be more likely to be burned upon contact with the heat supply. Moreover, with an external heat source, the heat must first pass through the tube wall before coming into contact with the water. Thus, the water, which is being used to heat the room in Christophers, is not more efficiently heated by an external heater. Christophers, with its internal electric heater, was more efficient and there is no reasonable teaching or suggestion in the prior art that would lead one to combine these two references.

Further, Edey taught a container that could be placed under a counter. The container had an electric heater positioned within it such that the electric heater also directly heated the water. The reference taught that water flowing into the container would replace heated water in the same manner that a household hot water heater functions. The supposed suggestion for

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combining Edey with the references above was to limit the heating volume. Edey, however, did not disclose a limited or small volume except for the extent that it disclosed a hot water tank that could be placed under a counter. Edey did not discuss limiting the volume of water that would be heated.

Again, the primary reference was a radiator for space heating. One of ordinary skill in the art would not likely be led to modify a space heating radiator to have a small volume of water given its intended use of heating a space, especially given the need for a large amount of heat transfer required to heat a small room. There is no reasonable teaching or suggestion in the prior art that would lead to combining Edey with the other two applied references to obtain the recited water heaters.

In short, the claims in the present application each recite a water heater for use with an aircraft wash basin or a method of heating small volumes of water or intermittent usage in an aircraft wash basin. The claims have been rejected based upon a combination of: (1) a space heating radiator that is connected into a hot water system of a building; (2) a hot plate heating element that uses a tubular heating body to heat water for heating the hot plate; and (3) an under the counter water heater that has a tank with an immersed electric heating element and that controls flow out only by controlling flow in. The only reasonable basis for combining these references is Appellant's own disclosure, which is an improper use of hindsight.

Thus, Claims 1, 2, 4 and 6-25 are patentable and reversal of the rejections is respectfully requested.

*The Applied Combination Renders Christophers Changes the Principle of Operation*

The applied combination also impermissibly changes the principle of operation of Christophers. As explained above, the primary reference, Christophers, taught a room heating radiator, which is commonly used to supply heat to a small room. Thus, heated water, supplied from a building heated water supply or heated by an internal electric heater, would be passed through the tubular members to heat the room. There was no teaching of supplying the heated water to the wash basin.

To make this modification would require significant changes to the operating principles of the closed circuit water flow path taught by Christophers. For instance, heating a constantly moving water flow involves different controls than heating an intermittently moving volume of

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water. Transitioning Christophers to a water heater for water to be supplied to the wash basin would require temperature controls, such as a thermostat or the like, which were not used in the simple structure taught by Christophers.

Moreover, as explained above, while Appellant does not agree with the Examiner's statement, the Examiner has relied upon Edey for a teaching of heating small amounts of water. Appellant submits that passing small amounts of water through Christophers' room heating radiator would render the radiator inoperable due to the small amount of heat carried by the system and available for heat transfer into the room. For at least these reasons, modifying Christophers such that it is a water heater for intermittent use and not a radiator that supports a wash basin would impermissibly change the principle of operation of Christophers.

Thus, Claims 1, 2, 4 and 6-25 are patentable and reversal of the rejections is respectfully requested.

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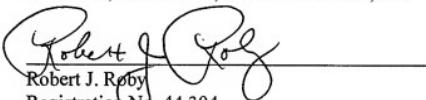
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### **VIII. CONCLUSION**

For the reasons set forth above, Appellants respectfully submit that the rejections of Claims 1, 2, 4 and 6-25 are improper and that Claims 1, 2, 4 and 6-25 are patentable. Appellants therefore request that the rejections be reversed.

Respectfully submitted,

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### **CLAIMS APPENDIX**

1. (Previously Presented) A water heating apparatus for use with a wash basin on an aircraft, the apparatus comprising:

a tube made of good heat conductive material, said tube comprising a plurality of coils with each coil engaging or being close to an adjacent coil;  
an electric heater extending along a substantial length of said tube in good heat conductive relation with the tube, said heater being positioned exterior to said tube such that deposits do not form on said heater, said heater comprising coils with each heater coil being adjacent a pair of adjacent tube coils but not encircling an axis of said tube; and  
said substantial length of said tube defining a volume of less than that required to contain approximately 14 ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water.

2. (Original) The apparatus of Claim 1, wherein the heater is brazed to the tube or joined to the tube with a heat conductive epoxy.

3. (Cancelled)

4. (Previously Presented) The apparatus of Claim 1, wherein said tube has a circular exterior cross-section such that said sections create a recess between said sections, and said heater is positioned in said recess.

5. (Cancelled)

6. (Previously Presented) The apparatus of Claim 1, wherein the heater coils are on the outside of the tube coils.

7. (Previously Presented) The apparatus of Claim 1, wherein the heater coils are on the inside of the tube coils.

8. (Previously Presented) The apparatus of Claim 1, wherein the tube and the heater define a tubular bundle of coils.

9. (Original) The apparatus of Claim 1, wherein said tube and said heater are each formed with a plurality of coils which are sufficiently large to extend around the exterior of a lower portion of a wash basin.

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10. (Previously Presented) The apparatus of Claim 9, including the wash basin, wherein the wash basin is sized and configured for placement in the aircraft.

11. (Previously Presented) The apparatus of Claim 1, wherein said heater configured to supply sufficient heat about 60° F to about 115 ° F in about three minutes.

12. (Original) The apparatus of Claim 11, wherein said tube has an outer diameter of about  $\frac{3}{4}$  of an inch and a length of about 74 inches.

13. (Original) The apparatus of Claim 12, wherein said tube is made of copper or stainless steel.

14. (Previously Presented) A method of heating small volumes of water for intermittent usage in a wash basin on an aircraft, said method comprising:

providing a tube to be connected to a water outlet, said tube being made of good heat conductive material;

providing an electric heater in good heat conductive relation with the tube, said tube and said electric heater being in contact over a length that defines a volume of less than that required to contain approximately 14 ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water.

15. (Original) The method of Claim 14 comprising:

providing said tube and said heater with coils, with said heater coils being in good heat conductive relation with adjacent tube coils.

16. (Previously Presented) The method of Claim 15 comprising:

applying electrical energy to the heater to heat less than about 14 ounces of water in said tube to at least about 115° F in no more than about three minutes.

17. (Previously Presented) The apparatus of Claim 1, wherein said coil has an inlet and an outlet and said outlet is in fluid communication with said aircraft wash basin.

18. (Previously Presented) The method of Claim 14, wherein said water outlet empties into said aircraft wash basin.

19. (Previously Presented) An aircraft sink water heater comprising a water tube, the water tube comprising an inlet and an outlet, the water tube comprising a spiral configuration to define a series of water tube coils, an electric heater comprising a spiral configuration to define a

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series of electric heater coils, the electric heater coils and the water tube coils having a common axis of curvature and each of the series of electric heater coils being in intimate relationship with only two adjacent coils of the water tube coils.

20. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the electric heater coils are positioned solely to the outside of the water tube coils.

21. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the electric heater coils are positioned solely to the inside of the water tube coils.

22. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the electric heater extends along substantially the entire length of the series of water tube coils.

23. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the water tube is formed of a potable water compatible material.

24. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the electric heater is insulated with a lightweight insulating material.

25. (Previously Presented) The aircraft sink water heater of Claim 19 further comprising a temperature responsive switch positioned within the water tube coils, the temperature responsive switch being in electrical communication with the electric heater.

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**IX. EVIDENCE APPENDIX**

None

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**X. RELATED PROCEEDINGS APPENDIX**

None

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